IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	Hummel et al.
Serial No.	10/532,635
Filing Date	September 12, 2005
Art Unit	1794
Confirmation No.	9433
Examiner	Watkins
Title	GYPSUM-BASED BUILDING MATERIAL
Attorney Docket No.	074060.3

Cincinnati OH 45202 September 14, 2008

DECLARATION OF HANS-ULRICH HUMMEL PURSUANT TO 37 CFR §1.132

I, HANS-ULRICH HUMMEL, declare as follows:

1. I am an inventor in the above-identified patent application.

2. I have over 15 years of experience in building materials, which is the subject of this application, including gypsum-based building materials. I have read the outstanding Office Action and understand the Examiner's position.

3. I understand that the Examiner rejects my method as obvious over Kiyomitsu in view of Purnell, and I respectfully disagree. In support, Dr. Lyman, my U.S. representative, submitted, with a June 30, 2008 Amendment, technical data and analysis, and discussed these with the Examiner during a July 19, 2008 personal interview.

4. I understand the Examiner requested, during the interview, that I make a personal Declaration to submit and discuss these technical data. I thus hereby declare that the technical data resulted from work performed both in my laboratory and under my direction.

5. These technical data are based on a method that parallels claim 1, which recites

> An interior finish building material comprising a gypsum-based building material composition for an interior finish, the composition containing from 1% by weight to 25% by weight of at least one naturally occuring zeolite, wherein the building material

is a building board and wherein the building material has less than 3% diatomaceous earth.

6. The material my laboratory analyzed contained 10% of clinoptilolite, a naturally occuring zeolite. Thus, it had "from 1% by weight to 25% by weight of at least one naturally occurring zeolite", as claim 1 requires. The naturally occuring zeolite that was used did not contain any relevant amount of diatomaceous earth. Thus, it "has less than 3% diatomaceous earth", as claim 1 requires.

7. The Examiner stated "It would have been obvious to one of ordinary skill in the art to have used natural zeolite in the wall board of Kiyomitsu as Purnell teaches either natural or synthetic zeolite for odor absorption". A person of ordinary skill in the art knows that zeolite must be dried to have absorptive activity; typically, temperatures above 200°C and up to 650°C are needed to remove water from zeolite. U.S. Patent No. 6,329,562, now resubmitted with my Declaration as Attachment A, recites:

> Prior to carrying out the adsorption, the water of crystallization must be removed from the zeolites. At temperatures between 150 and 650°C, optionally under reduced pressure, the majority of the water is removed from the zeolite. (col. 3 lines 12-16)

8. Kiyomitsu discloses, top of p. 6, a drying temperature as a calcination temperature of the zeolite particles of between 300°C and 700°C. Kiyomitsu further discloses adsorption is improved by calcination of the zeolite particles. Calcine, as known to one of ordinary skill in the art and defined in Webster's New Collegiate Dictionary, as to heat to a high temperature but without fusing in order to drive off volatile matter or to effect changes (submitted herewith as attachment "C"). Thus, Kiyomitsu's calcination procedure has the effect of dehydrating the zeolite by exposing the particles to temperatures between 300°C and 700°C.

9. During preparation of a building board, the zeolite that is either pre-treated by drying, or is not pre-treated, is brought into contact with a gypsum slurry containing water. Under these conditions, the zeolite will absorb water and become inactive. The drying temperature in the preparation of gypsum board is about 100°C, which is not sufficient to remove water from zeolite.

10. My co-inventors and I surprisingly found that by using from 1% by weight to 25% by weight of at least one naturally occuring zeolite, as claim 1 requires, these boards nevertheless have adsorptive properties. Thus, although naturally occuring zeolite is brought into contact with water, which inactivates its adsorptive properties, its adsorptive activity is re-established and it is activated during drying, although the normally necessary activation/drying temperatures for a zeolite are not reached.

11. This adsorption occurs in these boards even in the absence of diatomaceous earth. This is in contrast to Kiyomitsu' s boards. Kiyomitsu teaches a building material with a gypsum core containing 10% by weight to 40% by weight of zeolite particles in combination with 10% by weight to 40% by weight diatomaceous earth particles (¶ 7). The diatomaceous earth is used to absorb the moisture (¶ 11) and is able to bond large amounts of moisture. Thus Kiyomitsu's board materials must have a high concentration of both zeolite particles and diatomaceous earth particles, i.e., at least 10% diatomaceous earth.

12. I compared boards composed of 10% clinoptilolite, which is a naturally occuring zeolite, with boards composed of 10% Zeolite A, which is a non-naturally occuring zeolite. Both board samples contained no diatomaceous earth (0%). This is "less than 3% diatomaceous earth", as claim 1 recites.

13. The boards were exposed to test chambers contaminated with formaldehyde (HCHO). When formaldehyde is destroyed, carbon dioxide (CO_2) and other compounds are produced. The reaction is $HCHO + O_2 \rightarrow CO_2 + H_2O$. The ability of both board samples to convert formaldehyde can thus be monitored by assessing the amount of carbon dioxide produced. A higher carbon dioxide content indicates more formaldehyde removed.

14. Data in both table and graph form are resubmitted with this Declaration as Attachment B. Both the table and graph demonstrate that the board containing naturally occuring zeolite had higher carbon dioxide produced, and thus higher adsorption of formaldehyde, relative to board containing non-naturally occuring zeolite.

15. These data demonstrate that the claimed building material is not obvious over the non-naturally occurring board that Kiyomitsu discloses.

16. In contrast to my invention, Kiyomitsu teaches a person of ordinary skill in the art that a high concentration of both zeolite particles and diatomaceous earth particles (10%-40%, Abstract) are required. I and my co-inventors have found that boards using naturally occurring zeolites retain activity and do not need this high concentration of diatomaceous earth.

17. For each of these reasons, I respectfully assert that a person of ordinary skill in this art would not have predicted my claimed building material given that Kiyomitsu does not teach, motivate, or suggest it, and in fact teaches away from a building material with less than 10% diatomaceous earth.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issued thereon.

2008-09-14
Date

Hans-Ulrich Hummel

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